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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,372	04/18/2001	Takashi Shirasuna	35.G2775	6886

5514 7590 08/06/2002

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EXAMINER

JUBA JR, JOHN

ART UNIT	PAPER NUMBER
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2872

DATE MAILED: 08/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/836,372

Applicant(s)

SHIRASUNA, TAKASHI

Examiner

John Juba

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 35-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 35-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) Z.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Objections

Claims 38 – 40 are objected to because of the following informalities.

Appropriate correction is required:

In claim 38, line 9 “ha at” should read “has at” or similarly.

In claim 39, line 6, a period (.) appears where a comma is clearly intended.

In claim 40, line 6, a comma is missing between “second” and “third”.

Claim Rejections - 35 USC § 112

Claim 40 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 40 is incomplete and indefinite. There is no antecedent basis for said “fourth” lens unit, and it is apparent from the text bridging lines 5 and 6, that there is text missing from the claim. Thus, it appears that claim 40 is incomplete and the scope of the claim is uncertain.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 9, 11, 12 and 35 – 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi, et al (U.S. Patent number 5,815,320), in view of Yamanishi (U.S. Patent number 6,094,313). Referring to numerical examples 5 – 7, Hoshi, et al disclose a zoom lens system comprising strictly four lens units arranged (+)(-)(+)(-) from the object side, each of the lens units moving toward the object side upon zooming from the wide angle end to the telephoto end. As evident by inspection of Figures 9, 11, and 13 and the corresponding tables, the shape of the surface closest to the image side in the fourth lens unit is convex to the image side. Thus, Hoshi, et al disclose the invention substantially as claimed. However, Hoshi, et al do not disclose at least one diffractive optical surface among the lens units.

In the same field of endeavor, Yamanishi discloses a zoom lens system comprising strictly four lens units arranged (+)(-)(+)(-) from the object side, each of the lens units moving toward the object side upon zooming from the wide-angle end to the telephoto end. Yamanishi teach that even in such cases where the design is well corrected, it is possible and may be desirable to enhance correction of chromatic aberration by inclusion of a diffractive optical element (DOE) in any or all of the lens units (Col. 3, lines 9 – 15, lines 58 – 67).

It would have been obvious to one of ordinary skill to include at least one diffractive optical surface among the lens units of Hoshi, et al, in the interest of enhancing correction of chromatic aberration, as suggested by Yamanishi.

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With regard to claims 2 and 11, Yamanishi suggests correcting chromatic aberrations. One of ordinary skill would have understood these to comprise any or all of axial chromatic aberration, lateral chromatic aberration, and spherochromatism. Thus, Yamanishi fairly suggests each. In the case of axial chromatic aberration, it will be appreciated that the DOE would inherently have comprised as series of concentric, circularly symmetric annular zones, or "phase gratings", as recited.

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With regard to claims 3 and 36, ^{Yamanishi teaches} ~~Hoshi, et al teach~~ that each unit should be corrected for chromatic aberrations, and in this context suggest that a DOE enhances the correction (Col. 3, lines 58 – 67). Thus, it is believed that Hoshi, et al clearly suggest a DOE in the first lens unit as recited.

With regard to claim 4, given the Abbe numbers tabulated, and noting that the Abbe number of the diffractive element suggested by Yamanishi is inherently negative, chromatic aberration of the lens unit can only have been achieved if the optical power of the refractive elements and the optical power of the diffractive lens were of the same sign. The aggregate will thus have been of the same sign, and the recited relation will have been satisfied.

With regard to claims 5 and 35, the first unit consists of a negative lens with its concave surface facing the object side, and a positive lens in this order from the object side, as illustrated in at least Figure 9 or Figure 11.

With regard to claim 6, the second lens unit of Hoshi, et al comprises of a single negative lens element and an aperture stop.

With regard to claims 7 and 8, the cemented doublet of the third lens unit in Figures 9 and 11 of Hoshi, et al may be considered as one of two positive lens elements used in combination with a single negative lens element.

With regard to claims 9 and 40, each of the fifth through seventh examples of Hoshi, et al employs a fourth lens unit having the recited constitution.

With regard to claim 12, Hoshi, et al fairly disclose a non-illustrated embodiment in which the zoom lens is combined with a camera (Col. 1, lines 51 – 55), and thus fairly disclose an “optical-equipment element” within the specificity recited.

With regard to claim 37, it is clear from the tables that the aperture stop of Hoshi, et al is grouped with and moves as a unit with the second lens unit.

With regard to claim 38, the second lens unit of Hoshi, et al consists of a single negative lens element *and* an aperture stop. In the same field of endeavor, Yamanishi teach the use of an aperture stop in the third lens unit to perform the same function of limiting incident ray heights at the third lens unit. From the two teachings, one of ordinary skill would have recognized that the function could have been performed equally well at either location. Thus, barring any *unexpectedly* improved results arising from the exclusion of an aperture stop in the second lens unit, it appears that one of ordinary skill would have found it obvious to do so, insofar as the aperture would have performed equally as well at the location suggested by Yamanishi.

With regard to claim 39, summing the variable distances D4, D7, and D14 in the fifth example (Fig. 9) of Hoshi, et al, it appears that the distance between the first and fourth lens units is reduced by 0.15 mm upon zooming to telephoto.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi, et al (U.S. Patent number 5,815,320), in view of Yamanishi (U.S. Patent number 6,094,313), and further in view of Nishio (U.S. Patent number 5,978,153). As set forth above for claim 1, Hoshi, et al and Yamanishi disclose the invention substantially as claimed. However, these references do not disclose the manner in which the diffractive optical surface is to be realized.

In the same field of endeavor, Nishio discloses a zoom lens system having four lens units arranged (+)(-)(+)(-) and a diffractive optical element in one of the moving units (e.g., r_6 in Example 5). Nishio teaches that when applying diffractive optical surfaces to lenses in such an environment, it is preferable to form the diffractive features by laminating. Claims 1, 3, 4, 12, and 35 – 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi, et al (U.S. Patent number 5,815,320), in view of Yamanishi (U.S. Patent number 6,094,313). (Col. 15, lines 7+). In this manner, diffraction efficiency is improved, and flare is reduced.

It would have been obvious to one of ordinary skill to provide the diffractive surface in the zoom lens of Hoshi, et al and Yamanishi in the form of laminated diffractive phase gratings of different materials with differing indices, in the interest of providing the greatest diffraction efficiency and reduced flare, as suggested by Nishio.

Response to Amendment

Applicant's amendment to the specification and submission of the corresponding prior art are noted with appreciation.

Applicant's amendment to the specification as to the use of ϕL_i is noted with appreciation as overcoming the objection to the specification. The correction is fully supported by the specification as filed.

The amendment to Numerical Examples 2 & 3 is responsive to the examiner's earlier concern, and is regarded as *not* introducing new matter. The original designation of the amended entries as including a diffractive surface contradicted the criterion regarding the sign of " C_1 " as described on Page 12 (line 2) in connection with criterion (A-2) on Page 15. The error was apparent to the examiner, as it would have been to one of ordinary skill. By plotting the lens performance of the original and amended tabulations, and by comparing these plots with the originally plotted performance, it will be seen that the amendment is fully supported by the originally plotted lens performance.

The cancellation of claim 34 overcomes the previous rejection thereof under 35 U.S.C. §112, first paragraph.

The amendment of claim 4 overcomes the previous rejection thereof under §112, second paragraph. The cancellation of claims 16, 19, 20, and 27 renders their rejection moot.

Applicant's amendment of claims 1 and 12 is sufficient in overcoming the rejection of claims 1 – 5, 7, 8, and 10 – 12 under 35 U.S.C. §102(b) as being anticipated

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by Nishio (U.S. Patent number 5,978,153), who, in a system of strictly four lens groups arranged (+)(-)(+)(-) and having at least one DOE, do not disclose all four groups moving toward the object side upon zooming to the telephoto position. The cancellation of claims 13 – 17, 19, 20, 22 – 28, 30, 31, 33, and 34 moots their rejection.

The amendment of claims 1 and 12 is sufficient in overcoming the rejection of claims 1, 4 – 7, 9, 11, and 12 under §102(b) as being anticipated by Hayashi, et al (U.S. Patent number 6,002,519). The cancellation of claims 13, 16 – 19, 21, 23, 24, 27 – 30, 32, and 34 renders their rejection moot. Hayashi, et al do not disclose all four groups moving toward the object side upon zooming to the telephoto position.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

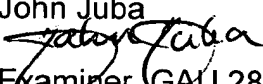
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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cassandra Spyrou can be reached on Mon.- Thu., 9 - 5. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

John Juba

Examiner, GAU 2872

JJ
August 2, 2002